

Joint Research Centre

Certified reference materials for organic pollutants in the environment

Organochlorine pesticides

Material	Certified values		
ERM-BB430 Pork fat 5 g	HCb [mg/kg]		0.193 ± 0.017
	α-HCH [mg/kg]		0.25 ± 0.04
	β-HCH [mg/kg]		0.109 ± 0.010
	β-HEPO [mg/kg]		0.213 ± 0.016
	p,p'-DDT [mg/kg]		0.48 ± 0.07
	p,p'-DDD [mg/kg]		0.222 ± 0.022
	p,p'-DDE [mg/kg]		0.38 ± 0.09

Perfluoralkyl Substances (PFASs)

Material	Certified values		
IRMM-427 Fish tissue (Pike-Perch) 35 g	Linear perfluorooctane sulfonate (L-PFOS) [ng/g]		16.0 ± 1.7
	Perfluorodecanoic acid (PFDA) [ng/g]		1.28 ± 0.17
	Perfluoroundecanoic acid (PFUnDA) [ng/g]		0.74 ± 0.20
	Perfluorododecanoic acid (PFDoDA) [ng/g]		0.97 ± 0.21
	Perfluorobutane sulfonate (PFBS) [ng/L]		5.5 ± 1.4
IRMM-428 Water 410 mL	Perfluorohexane sulfonate (PFHxS) [ng/L]		3.6 ± 1.0
	Linear perfluorooctane sulfonate (L-PFOS) [ng/L]		9.6 ± 1.7
	Perfluorodecanoic acid (PFDA) [ng/L]		4.0 ± 1.0
	Perfluoropentanoic acid (PFPeA) [ng/L]		7.4 ± 1.0
	Perfluorohexanoic acid (PFHxA) [ng/L]		3.7 ± 0.7
	Perfluoroheptanoic acid (PFHpA) [ng/L]		

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Material	Certified values		
BCR-598 Cod liver oil 5 g	HCb [mg/kg]		55.7 ± 2.0
	α-HCH [μg/kg]		42 ± 3
	β-HCH [μg/kg]		16 ± 3
	γ-HCH [μg/kg]		23 ± 4
	γ-Chlordane [μg/kg]		6.9 ± 1.6
	α-Chlordane [μg/kg]		24.4 ± 1.8
	Oxychlordane [μg/kg]		11.0 ± 1.8
	Transnonachlor [μg/kg]		39 ± 4
	Dieldrin [mg/kg]		59 ± 4
	p,p'-DDE [mg/kg]		0.61 ± 0.04
	o,p'-DDD [μg/kg]		30 ± 4
	p,p'-DDD [mg/kg]		0.40 ± 0.03
	p,p'-DDT [mg/kg]		0.179 ± 0.018
BCR-187 Milk powder 20 g	HCb [μg/kg]		1.45 ± 0.21
	α-HCH [μg/kg]		1.80 ± 0.14
	p,p'-DDE [μg/kg]		6.6 ± 0.6
BCR-188 Milk powder (spiked) 20 g	HCb [μg/kg]		37.4 ± 2.7
	β-HCH [μg/kg]		12.0 ± 1.2
	β-HEPO [μg/kg]		32.0 ± 1.9
	p,p'-DDE [μg/kg]		51 ± 4
	Dieldrin [μg/kg]		36.1 ± 2.5
	Endrin [μg/kg]		6.2 ± 0.9
	p,p'-DDT [μg/kg]		69 ± 5

Indicative values for γ-HCH, Dieldrin and Endrin are assigned.

Polycyclic aromatic hydrocarbons (PAHs)

	BCR-524 Contaminated industrial soil, 40 g [mg/kg]	BCR-535 Freshwater harbour sediment, 40 g [mg/kg]	BCR-683 Beech wood, 60 g [mg/kg]	ERM-CZ100 Fine dust, (PM10-like), 0.5 g [mg/kg]
Pyrene	173 ± 11	2.52 ± 0.18	6.5 ± 0.7	
Benzo[a]anthracene	22.5 ± 1.8	1.54 ± 0.10	3.4 ± 0.4	0.91 ± 0.07
Benzo[a]pyrene	8.6 ± 0.5	1.16 ± 0.10	9.3 ± 1.0	0.72 ± 0.05
Benzo[e]pyrene	10.6 ± 1.4	1.86 ± 0.13	5.8 ± 0.6	
Benzo[b]fluoranthene	13.5 ± 1.6	2.29 ± 0.15	2.58 ± 0.29	1.42 ± 0.14
Benzo[j]fluoranthene				0.75 ± 0.14
Benzo[k]fluoranthene	6.2 ± 0.6	1.09 ± 0.15		0.67 ± 0.06
Benzo[b]naphtho[2,1-d]-thiophene	3.8 ± 0.6			
Indeno[1,2,3-cd]pyrene	5.1 ± 0.4	1.56 ± 0.14	3.6 ± 0.5	1.07 ± 0.10
Pentachlorophenol	0.034 ± 0.005			

Confidence in measurements

All certificates and detailed production information can be found at <https://crm.irmm.jrc.ec.europa.eu>

<https://ec.europa.eu/jrc/>

Polychlorinated biphenyls (PCBs)

PCB No	BCR-481 Industrial soil, 25 g [mg/kg]	BCR-536 Freshwater harbour sediment, 40g [µg/kg]	BCR-420 Waste mineral oil, 7.5 g [mg/kg]	BCR-449 Waste mineral oil, 50 g [mg/kg]	BCR-349 Cod liver oil, 2 g [mg/kg]	ERM-BB350 Fish oil, 2 g [ng/g]	BCR-682 Mussel tissue, 70 g [mg/kg]	BCR-718 Canned fresh herring, 70 g [µg/kg]	BCR-719 Canned fresh chub, 70 g [ng/kg]
28		44 ± 5	0.61 ± 0.06	0.80 ± 0.07	68 ± 8	21.3 ± 1.1	0.30 ± 0.07	0.41 ± 0.04	196 ± 7 13.6 ± 0.5
52		38 ± 4		31.4 ± 1.8	149 ± 21	37.4 ± 2.2	0.78 ± 0.09	1.00 ± 0.06	
74						23.0 ± 1.9			
77									
81									
99						62 ± 6			200 ± 0.8
101	37 ± 3	44 ± 4	1.45 ± 0.18	57.2 ± 1.9	372 ± 18	111 ± 5		2.12 ± 0.07	
105		3.5 ± 0.6		17.4 ± 1.0		25.8 ± 2.1		0.63 ± 0.06	
110						54.1 ± 2.8			
118	9.4 ± 0.7	28 ± 3	1.69 ± 0.14	46.6 ± 2.4	460 ± 40	84 ± 4	2.6 ± 0.3	1.78 ± 0.07	
126									1.80 ± 0.23
128	9.1 ± 0.8	5.4 ± 1.2		12.5 ± 0.7				0.62 ± 0.11	
138		27 ± 4				137 ± 10	4.6 ± 0.8	2.97 ± 0.11	
149	97 ± 7	49 ± 4				88 ± 9	5.7 ± 0.9	2.58 ± 0.12	
153	137 ± 7	50 ± 4	0.92 ± 0.06	39.0 ± 1.7	940 ± 40	220 ± 11	9.2 ± 0.8	4.62 ± 0.11	
156	7.0 ± 0.5	3.0 ± 0.4		6.9 ± 0.5		20.1 ± 1.3		0.19 ± 0.09	
163		17 ± 3							1.80 ± 0.23
169									
170	52 ± 4	13.4 ± 1.4		6.6 ± 0.6			0.17 ± 0.05	0.35 ± 0.03	
177						25.8 ± 2.0			
180	124 ± 6	22 ± 2	0.195 ± 0.017	10.4 ± 0.4	282 ± 23	67 ± 4	0.77 ± 0.07	0.80 ± 0.03	
183						22.5 ± 1.8			
187						67 ± 5			
194						23.4 ± 1.5			
197						41 ± 7			

Chlorobenzenes, dioxins and furans

	BCR-529 Industrial (sandy) soil, 50 g [mg/kg]	BCR-530 Industrial (clay) soil, 50 g [mg/kg]	BCR-677 Sewage sludge, 40 g [ng/kg]	BCR-490 Fly ash, 30 g [mg/kg]	BCR-615 Fly ash, 50 g [ng/kg]
1,2,3-trichlorobenzene	630 ± 110	15000 ± 4000			
3,4-dichlorophenol	23.0 ± 4.0	6000 ± 500			
2,4,5-trichlorophenol	151 ± 100	40000 ± 7000			
Pentachlorophenol	230 ± 40	470 ± 90			
2,3,7,8-TCDD(D48)	4.5 ± 0.6		1.51 ± 0.16	0.169 ± 0.012	27 ± 5
1,2,3,7,8-PeCDD(D54)	0.44 ± 0.05		4.1 ± 0.9	0.67 ± 0.04	92 ± 12
1,2,3,4,7,8-HxCDD(D66)	1.22 ± 0.21			0.95 ± 0.11	74 ± 12
1,2,3,6,7,8-HxCDD(D67)	5.4 ± 0.9	0.061 ± 0.011	235 ± 16	4.8 ± 0.4	103 ± 13
1,2,3,7,8,9-HxCDD(D70)	3.0 ± 0.4	0.0218 ± 0.0029	79 ± 7	2.84 ± 0.17	108 ± 16
1,2,3,4,6,7,8-H ₇ CDD(D73)			3500 ± 400		870 ± 130
O ₈ CDD(D75)			12700 ± 800		1750 ± 200
2,3,7,8-TCDF(F83)	0.078 ± 0.013		45 ± 4	0.90 ± 0.05	86 ± 28
1,2,3,7,8-PeCDF(F94)	0.145 ± 0.028	0.24 ± 0.04	24.8 ± 1.6	1.71 ± 0.12	176 ± 26
2,3,4,7,8-PeCDF(F114)	0.36 ± 0.07	0.62 ± 0.07	16.9 ± 1.5	1.85 ± 0.11	125 ± 20
1,2,3,4,7,8-HxCDF(F118)	3.4 ± 0.5	0.321 ± 0.016	14.5 ± 1.6	2.37 ± 0.12	203 ± 21
1,2,3,6,7,8-HxCDF(F121)	1.09 ± 0.15	0.186 ± 0.023	6.1 ± 0.8	2.64 ± 0.14	204 ± 23
1,2,3,7,8,9-HxCDF(F124)	0.022 ± 0.010		0.84 ± 0.29	0.34 ± 0.05	13.3 ± 2.0
2,3,4,6,7,8-HxCDF(F130)	0.37 ± 0.05	0.126 ± 0.012	5.6 ± 0.6	2.47 ± 0.17	130 ± 15
1,2,3,4,6,7,8-H ₇ CDF(F131)			62 ± 3		750 ± 90
1,2,3,4,7,8,9-H ₇ CDF(F134)			63 ± 0.8		61 ± 6
O ₈ CDF(F135)			177 ± 7		290 ± 40

How to order reference materials

From JRC in Geel

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